

**Aura Validation Experiment  
Science Flight #7 Summary Report  
November 10, 2004**

Flight Objective:

Provide: (1) remote sensing observations for OMI scanning observational points in a longitudinal profile across the Gulf of Mexico and (2) deep vertical profile of trace gases at MLS observation point.

Flight Summary:

The flight on Wednesday, 10 November, was arranged to coincide with an Aura overpass that followed a track through central Texas. The aircraft flight track was located primarily in the Gulf of Mexico, east of the satellite track. The aircraft flight began with a deep upward spiral starting at 20 kft near Corpus Christi, Texas, and reaching 55 kft. The aircraft then returned to 41 kft near the time of the Aura overpass. At this point, a long, level leg to the east was begun to be perpendicular to the Aura ground track. The aircraft passed over mixed layers of high and low clouds as it ranged as far east as the Mississippi-Alabama border. The aircraft returned on a parallel track slightly north of the outbound track. The tracks were aligned to sample along a horizontal swath viewed in successive images by the OMI satellite. The varied cloud fields as measured were a key diagnostic for OMI validation. After returning to the west end of the return track across the Gulf, the aircraft returned to Ellington.

Preliminary indications are that all instruments worked for most of the flight. Accordingly, we expect that this flight will result in valuable comparisons between MLS, TES, OMI, and the aircraft instruments.

Weather information is available in Figures 2-4.

Flight Profile (see Figure 1)

Takeoff: 11:56 CST

Landing: 17:28 CST

Duration: 5.5 hrs

Point 3: N28° 11', W96°18'

Point 6: N26° 50', W97° 55'

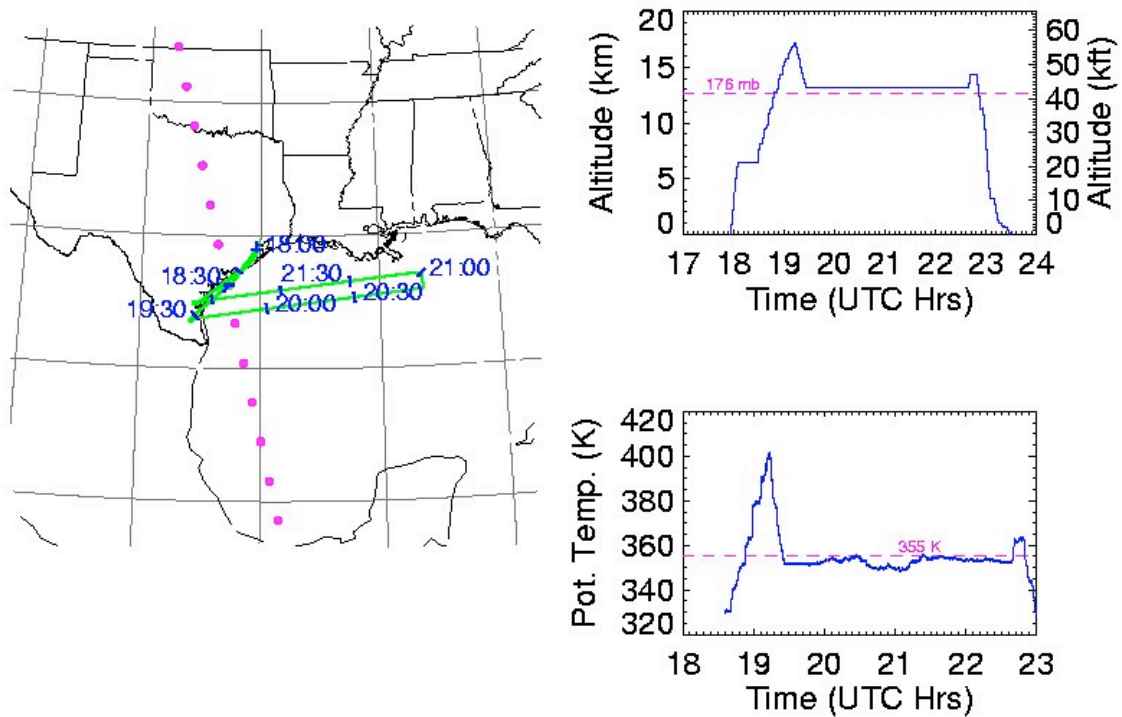
Point 7: N27° 55', W88° 10'

Point 8: N28° 32', W88° 14'

Point 9: N27°26', W98° 04'

Aircrew: Scott Reagan, Pilot, and Brian Barnett, Backseater

## WB-57 Flight of 2004-11-10



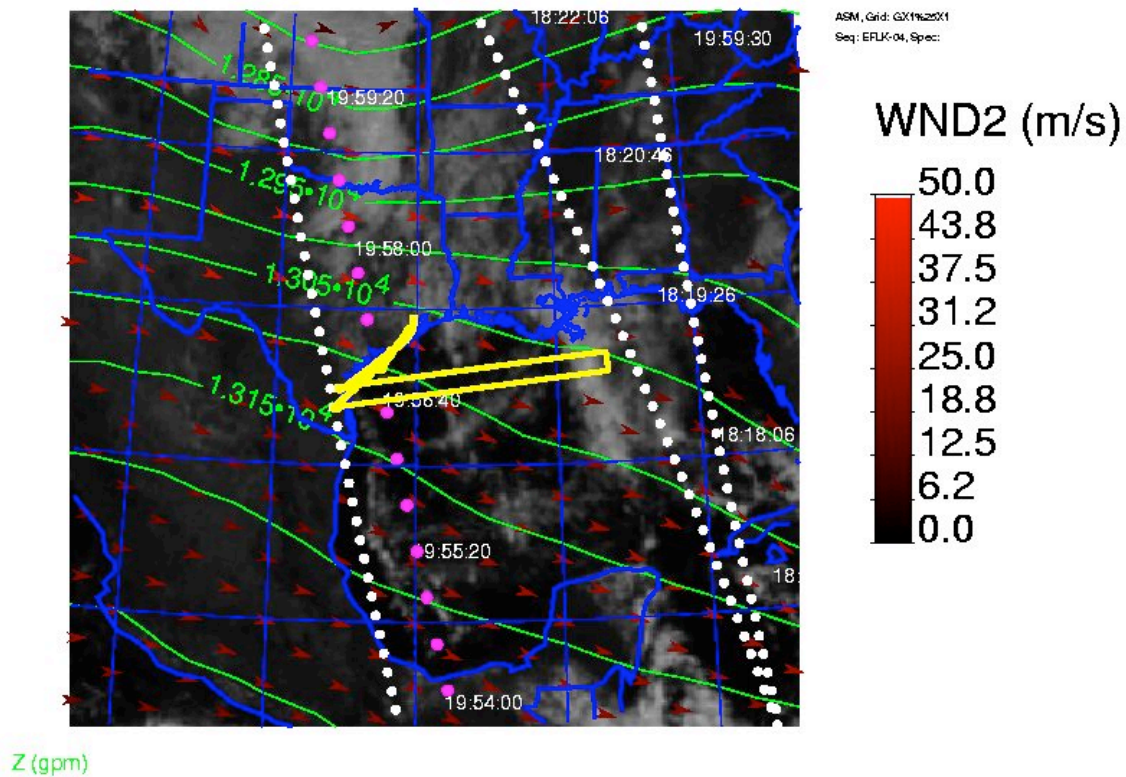
**Figure 1 – Flight Profile**

(Left) Map of WB-57F flight track (in green) with every half-hour marked. Aura nadir (faint cyan points) and MLS tracks (magenta points) are indicated.

(Upper Right) Plot of pressure altitude vs. time with the principal pressure levels of the flight marked.

(Lower Right) Plot of potential temperature vs. time with the principal theta levels of the flight marked.

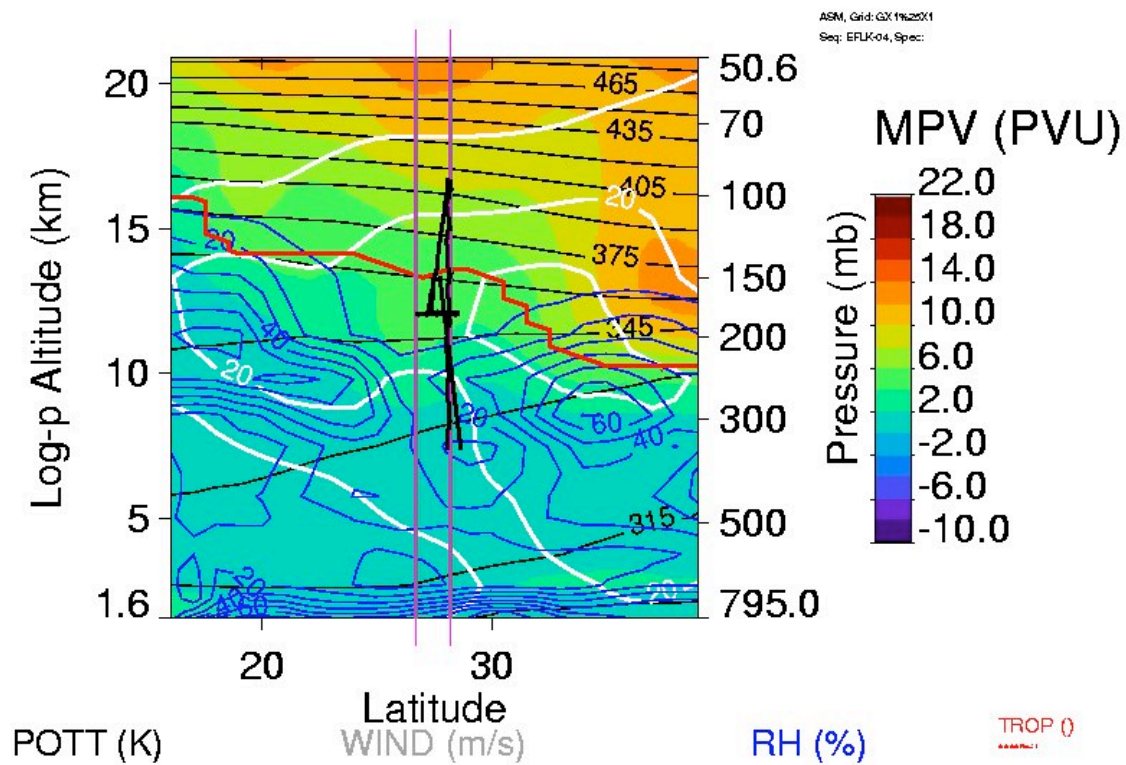
18 UTC on 10 November, 2004 at 176.0 mb



**Figure 2 – GOES Visible Image**

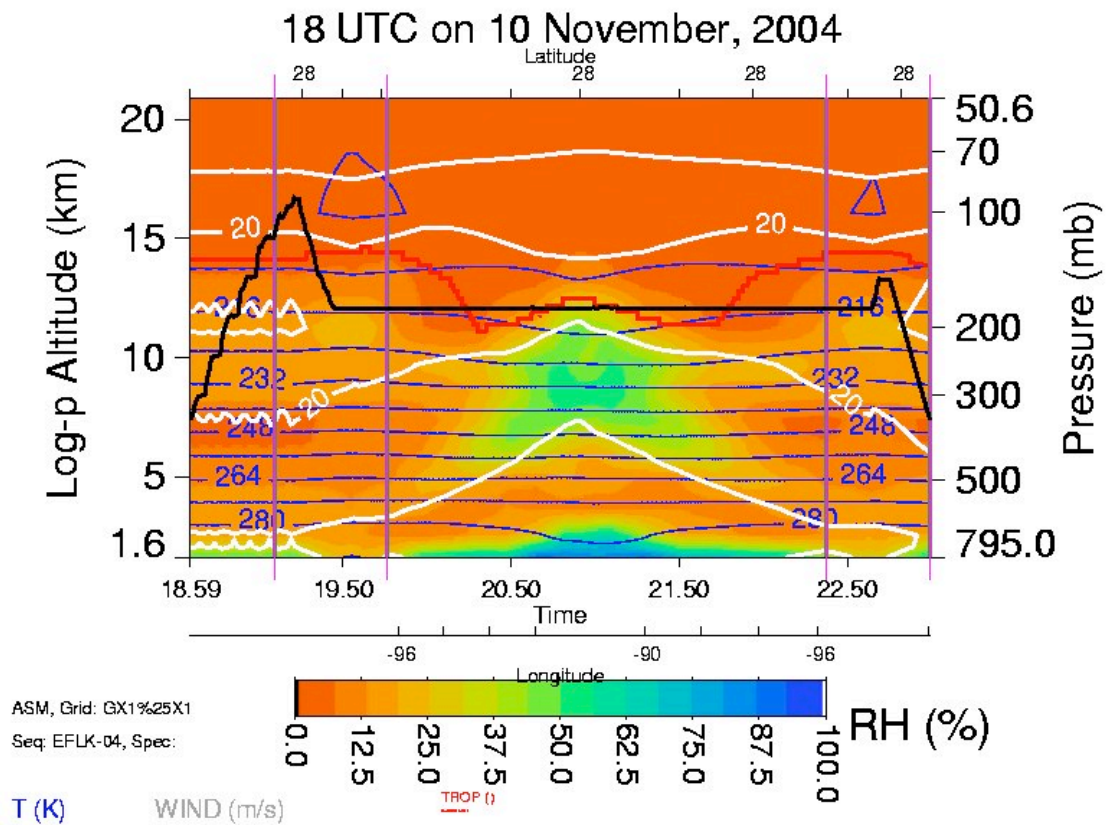
Flight track (yellow line) superimposed on meteorological fields. The grayscale image is the GOES-12 visible channel satellite image. The red arrows and green lines are the winds (WND2) and the geopotential heights (Z) at the principal pressure level at which the aircraft spent the most time. Values are from the GSFC GMAO assimilation analyses. The Aura nadir (cyan) and MLS tracks (magenta) are shown, with times along the ground track indicated.

18 UTC on 10 November, 2004 at -94.1 Longitude



**Figure 3 – Latitude Height Cross Section**

Latitude-pressure cross-section of meteorological fields during the flight. The colored image represents modified potential vorticity (MPV); also shown are potential temperature (POTT) (thin black lines), wind speed (WIND) (white lines), relative humidity (RH) (blue lines), and the PV tropopause (TROP) (red line). The thick black lines mark the aircraft position and the vertical lines mark the positions of nearby MLS profiles.



**Figure 4 – Curtain Plot**

Time-pressure "curtain" plot of meteorological vertical profiles along the flight track. The colored image represents relative humidity; also shown are temperature (T) (blue lines), wind speed (WIND) (white lines), and the PV tropopause (TROP) (red line). The thick black lines mark the aircraft position and the vertical lines mark the positions of nearby MLS profiles.